CLAIMS

What is claimed is:

1. A timepiece comprising a date display, wherein the timepiece comprises:

a date display assembly comprising:

a date ring having a plurality of digits thereon;

a first gearing assembly comprising one or more wheels, being meshingly coupled to the date ring so that the rotation of the one or more wheels causes the rotation of the date ring; and

a stepping motor comprising a rotor, wherein the rotor of the stepping motor is rotatably coupled to the at least one or more wheels of the first gearing assembly, wherein the rotation of the rotor causes the date ring to rotate;

a date-keeping assembly operatively coupled to the date display assembly, comprising:

at least a second gearing assembly comprising at least an hour wheel and a detection wheel assembly operatively coupled by rotation to the hour wheel,

wherein at least certain rotational increments of the detection wheel, and the clockwise or counterclockwise direction thereof, causes the rotor of the stepping motor to rotate so that the date ring can be rotated in one of a clockwise or counterclockwise direction;

whereby the rotation of the hour wheel through a predetermined midnight position results in that the stepping motor causes the date ring to rotate a predetermined number of degrees, thereby advancing either in the forward or backward direction a displayed digit on the date ring.

2. The timepiece as claimed in claim 1, wherein the date-keeping assembly comprises:

at least a second stepping motor comprising a rotor, wherein the rotor of the at least second stepping motor is operatively coupled to the hour wheel;

wherein the hour wheel is rotateable by the rotation of the at least second stepping

motor.

3. The timepiece as claimed in claim 1, wherein the date-keeping assembly comprises:

a spring assembly comprising at least three deflectable fingers; and

wherein the detection wheel comprises a first tab, a second tab and a third tab, wherein each tab is positioned such that:

only the first tab is contactable with the first finger;

only the second tab is contactable with the second finger; and

only the third tab is contactable with the third finger.

4. The timepiece as claimed in claim 3, wherein each tab is positioned in a different horizontal plane and offset from each other when viewed along a longitudinal axis of the detection wheel.

5. The timepiece as claimed in claim 3, wherein the date-keeping assembly comprises:

first, second and third electrically conductive pads to which each of the respective three deflectable fingers can make contact;

wherein when:

the first tab contacts the first finger, the first finger makes electrical contact with the first conductive pad;

the second tab contacts the second finger, the second finger makes electrical contact with the second conductive pad;

the third tab contacts the third finger, the third finger makes electrical contact with the third conductive pad, and no two fingers can simultaneously make electrical contact with their respective pads;

wherein a microcontroller or a quartz analog circuit maintains information about the rotation of the detection wheel, and whether the detection wheel is rotating in the clockwise or counterclockwise direction, based on the respective sequence of contacts between the deflectable fingers and their respective conductive pads.

6. The timepiece as claimed in claim 2, wherein the date-keeping assembly comprises

an intermediate date wheel that is meshingly engaged between the hour wheel and the detection wheel, such that:

the rotation of the hour wheel causes the intermediate date wheel to rotate, and the intermediate date wheel imparts rotation to the detection wheel;

wherein the intermediate date wheel is dimensioned to ensure that the hour wheel and the detection wheel rotate at a 2:1 ratio.

7. The timepiece as claimed in claim 1, comprising a casing, and a display window for displaying a date, wherein the date ring is aligned in the casing such that each of the plurality of digits is appearable in the display window.

8. A timepiece comprising a date display function, wherein the timepiece comprises:

a date display assembly comprising:

a date ring having a plurality of digits thereon;

a first gearing assembly comprising one or more wheels, being meshingly coupled to the date ring so that the rotation of the one or more wheels causes the rotation of the date ring; and

a stepping motor comprising a rotor, wherein the rotor of the stepping motor is rotatably coupled to the at least one or more wheels of the first gearing assembly, wherein the rotation of the rotor causes the date ring to rotate;

a date-keeping assembly operatively coupled to the date display assembly, comprising:

at least a second gearing assembly comprising at least an hour wheel and a detection wheel operatively coupled by rotation to the hour wheel, and

means for receiving signals based on at least certain rotational increments of the detection wheel, and wherein the means can maintain information regarding the clockwise or counterclockwise rotation direction of the detection wheel, and further wherein the means processes such signals and based thereon, causes the rotor of the stepping motor to rotate in one of a clockwise or counterclockwise rotation direction so that the date ring can be rotated in one of a clockwise or counterclockwise direction;

whereby the rotation of the hour wheel through a predetermined midnight position

results in the date ring rotating a predetermined number of degrees, thereby advancing either in the forward or backward direction a displayed digit on the date ring.

9. The timepiece as claimed in claim 8, wherein the date-keeping assembly comprises:

at least a second stepping motor comprising a rotor, wherein the rotor of the at least second stepping motor is operatively coupled by rotation to the hour wheel;

wherein the hour wheel is rotateable by the rotation of the at least second stepping motor.

10. A method of maintaining and displaying at least one of date and day information in a timepiece, wherein the timepiece comprises:

a date display assembly comprising a date ring having a plurality of digits thereon, a first gearing assembly comprising one or more wheels being meshingly coupled to the date ring so that the rotation of the one or more wheels causes the rotation of the date ring, and a first stepping motor comprising a rotor, wherein the rotor of the first stepping motor is rotatably coupled to the at least one or more wheels of the first gearing assembly, wherein the rotation of the rotor causes the date ring to rotate;

a date-keeping assembly operatively coupled to the date display assembly, the date-keeping assembly comprising an hour wheel, and a detection wheel assembly operatively coupled by rotation to the hour wheel,

means for signaling the stepping of the first stepping motor, wherein at least certain rotational increments of the detection wheel assembly, and the clockwise or counterclockwise direction thereof, provides signals to the means to cause the rotor of the first stepping motor to rotate; and

at least a second stepping motor comprising a rotor, wherein the rotor of the at least second stepping motor is operatively coupled by rotation to the hour wheel, wherein the hour wheel is rotateable at least in part by the rotation of the second stepping motor; wherein the rotation of the rotor of the second stepping motor is caused by and under the control of the means;

wherein the method comprises the steps of:

determining when the means has stopped the rotation of the rotor of the second stepping motor, and commencing a measuring of an elapsed period of time; wherein the commencement of the measurement step is independent of the time of day;

determining when the elapsed period of time is at least essentially equal to 24 hours; and

stepping the rotor of the first stepping motor in a direction so that the date ring rotates and the digit on the date ring showing the next correct date is displayed.

11. The method as claimed in claim 10, including the steps of:

commencing a subsequent measurement of an elapsed period of time while the means is still not providing signaling to rotate the rotor of the second stepping motor;

determining when the elapsed period of time measured in the subsequent measurement is at least essentially equal to 24 hours; and

stepping the rotor of the first stepping motor in the direction so that the date ring rotates and the digit on the date ring showing the next correct date is displayed.

12. The method as claimed in claim 11, including the steps of:

continually commencing additional measurements of elapsed periods of time as long as the means is not providing signaling to rotate the second stepping motor; and

stepping the rotor of the first stepping motor, at least essentially every 24 hours in the direction, so that the date ring rotates and the digit showing the next correct date is displayed.

13. The method as claimed in claim 10, wherein the timepiece further comprises a setting stem removably engageable with a gearing arrangement which itself is engageable with the hour wheel, and wherein the hour wheel is rotateably coupled to a day disc which includes a plurality of day indicia thereon indicative of the days of the week;

wherein the method comprises the steps of:

measuring the number of elapsed 24 hour periods of time; and,

while the means are not providing signaling to rotate the second stepping motor and the setting stem is engaged with the gearing arrangement:

adjusting the day disc by rotating the setting stem, wherein the day disc is adjustably rotated a calculated number of days depending on the number of

measured elapsed 24 hour period of times; and

blocking further rotation of the date ring by preventing the rotation of the rotor of the first stepping motor until the day disc has been rotated the calculated number of days.

14. The method as claimed in claim 13, wherein the blocking step includes the suppression of signaling from the means to the first stepping motor to rotate the rotor thereof.

15. The method as claimed in claim 13, including a day counter that maintains the number of measured elapsed 24-hour periods of time; wherein the method includes the steps of:

determining if the number of elapsed 24 hour periods of time is equal to seven (7); and

if so:

initializing the day counter to a starting value.

16. A method of maintaining and displaying at least one of date and day information in a timepiece, wherein the timepiece comprises:

a date display assembly comprising:

a date ring having a plurality of digits thereon, a first gearing assembly comprising one or more wheels being meshingly coupled to the date ring so that the rotation of the one or more wheels causes the rotation of the date ring, and a stepping motor comprising a rotor, wherein the rotor of the stepping motor is rotateably coupled to the at least one or more wheels of the first gearing assembly, wherein the rotation of the rotor causes the date ring to rotate;

a date-keeping assembly operatively coupled to the date ring assembly, the date-keeping assembly comprising:

an hour wheel, and a detection wheel assembly operatively coupled by rotation to the hour wheel,

wherein at least certain rotational increments of the detection wheel assembly, and the clockwise or counterclockwise direction thereof, causes the rotor of the stepping motor to rotate so that the date ring can be rotated in one of a clockwise or counterclockwise

direction,

wherein the method comprises the steps of:

determining that the detection wheel assembly has been rotated a certain number of rotational increments in the clockwise or counterclockwise direction; and

causing the rotor of the stepping motor to rotate so that the date ring can be rotated in one of a clockwise or counterclockwise direction.

17. The method as claimed in claim 16, wherein the date-keeping assembly comprises:

a spring assembly comprising at least three deflectable fingers, and the detection wheel assembly comprises a first tab, a second tab and a third tab, wherein each tab is positioned such that (i) only the first tab is contactable with the first finger; (ii) only the second tab is contactable with the second finger; (iii) only the third tab is contactable with the third finger;

first, second and third electrically conductive pads to which each of the respective three deflectable fingers can make contact;

wherein when:

the first tab contacts the first finger, the first finger makes electrical contact with the first conductive pad;

the second tab contacts the second finger, the second finger makes electrical contact with the second conductive pad;

the third tab contacts the third finger, the third finger makes electrical contact with the third conductive pad, and no two fingers can simultaneously make electrical contact with their respective pads;

wherein a means can maintain information about the rotation of the detection wheel assembly and whether the detection wheel is rotating in the clockwise or counterclockwise direction based on the respective sequence of contacts between the deflectable fingers and their respective conductive pads;

the method comprising the further steps of:

rotating the date ring in one of a clockwise and counterclockwise direction if:

the means detects an electrical connection between the second finger and the second conductive pad and the previously detected electrical connection was between the first finger and the first conductive pad; and

rotating the date ring in the other of the clockwise or counterclockwise direction if:

the means detects an electrical connection between the first finger and the first conductive pad after the previously detected electrical connection being between the second finger and the second conductive pad.

18. The method as claimed in claim 10, wherein the means is a microcontroller or a quartz analog circuit.